

# **HP Pay per use (PPU) User's Guide for versions 7.x**

**Fourth Edition**



**Manufacturing Part Number: 5991-1113**

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United States

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## Contents

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## About This Guide

The *HP Pay per use (PPU) User's Guide for versions 7.x* provides you with the most recent information for using the Pay per use (PPU) version 7 software. This document describes PPU version B.11.23.07.02 on HP-UX 11i v2 systems, B.07.00 on HP-UX 11i v1 systems, and PPU version 7.1 on Windows systems.

The latest version of this document can be found online at:  
**<http://www.docs.hp.com>.**

This chapter covers the following topics:

- “Intended Audience” on page 7
- “New and Changed Information in This Edition” on page 7
- “Publishing History” on page 8
- “Document Organization” on page 10
- “Typographic Conventions” on page 11
- “PPU Documentation” on page 12
- “HP Encourages Your Comments” on page 13

## Intended Audience

All personnel with system administrator access (that is, with `root` login privileges on HP-UX systems, or Administrator or Admin equivalent on Windows systems) to a PPU system should read and understand the contents of this document and the implications of managing a PPU system.

Administrators are expected to have knowledge of HP-UX or Microsoft Windows Server 2003 operating system concepts, commands, and configuration.

This document is not a tutorial.

## New and Changed Information in This Edition

This fourth edition of the *HP Pay per use (PPU) User's Guide for versions 7.x* has the following changes (from the third edition):

- Version numbers have been updated
- Changes to reflect new PPU features on HP-UX:
  - Support of virtual partitions (vPars) on HP-UX 11i v2
  - Support for expanded hostnames
- Changes to reflect new PPU features on Windows Server 2003:
  - Support for systems with Microsoft Windows Server 2003 Service Pack 1 (SP1)
  - Support for an installer separate from the WMI nPar Provider installer
- The User's Guide has been reorganized, resulting in a streamlined User's Guide

## **Publishing History**

The document printing date and part number indicate the document's current edition. The printing date will change when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The document part number will change when extensive changes are made.



Document updates may be issued between editions to correct errors or document product changes. To ensure that you receive the updated or new editions, you should subscribe to the appropriate product support service. Contact your HP sales representative for details.

**Table 1 Publishing History Details**

<b>Document Manufacturing Part Number</b>	<b>Operating Systems Supported</b>	<b>Supported Product Versions</b>	<b>Publication Date</b>
5991-1113 Fourth edition	HP-UX 11i v2  Microsoft Windows Server 2003, version 3.2 and higher (64-bit, Enterprise and Datacenter Editions)	B.11.23.07.02  7.1	May 2005
5991-0758 Third edition	Microsoft Windows Server 2003, version 3.2 (64-bit, Enterprise and Datacenter Editions)  HP-UX 11i v1 HP-UX 11i v2	7.01  B.07.00	December 2004
T2351-90041 Second edition	HP-UX 11i v2 HP-UX 11i v1	B.11.23.07.00 B.07.00	September 2004
T2351-90036 First edition	HP-UX 11i v1	B.07.00	June 2004

Note that for commonality across all platforms supported by PPU, generic references to version numbers are of the form “7.x” in this document. But because the operating system version is also incorporated in the version number on newer releases of HP-UX, specific references to version numbers are the precise version number for the particular

platform, for example, B.11.23.07.02 for an HP-UX depot. Specific version references on Windows drop the leading “B”, for example, 7.01 and 7.1.

## Document Organization

This user’s guide is not designed to be read from front to back in its entirety. For a general understanding of PPU versions 7.x, you should read this information:

1. This chapter — **About This Guide** (entirely)
2. Chapter 1 — **Pay PerUse Overview** (entirely)
3. Chapter 2— **Understanding PPU Requirements** (entirely)
4. Chapter 3 — **Installing and Configuring PPU Software** (**Getting Started** section)

After reading this information, you can utilize the table of contents and index for specific topics of interest.

Here is a summary of the chapters and appendixes in this guide:

- **About This Guide** — Use this chapter for information on this document’s intended audience, changes for this edition of the guide, publishing history, document organization, typographic conventions, available PPU documentation, and how to provide feedback.
- **Chapter 1, PPU Overview** — Use this chapter for an overview of the PPU program, an overview of a PPU system, the most recent PPU version and supported platforms, and changes for this version of the software.
- **Chapter 2, Understanding PPU Requirements** — Use this chapter to understand PPU: program, software, and system move requirements.
- **Chapter 3, Installing and Configuring PPU Software** — Use the **Getting Started** section to help you verify whether your PPU system is correctly installed and configured, and corrective actions to take if it is not. This chapter also has instructions on how to install, configure, uninstall, or reinstall the PPU software.

- **Chapter 4, Using the PPU Software** — Use this chapter for an explanation of the PPU web portal, PPU usage reports, utilization capping, and what to do when creating a new partition in a PPU system.
- **Chapter 5, Troubleshooting** — Use this chapter for a step-by-step procedure to resolve problems with the PPU software.
- **Chapter 6, Frequently Asked Questions** — Use this chapter for answers to questions on common PPU software topics.
- **Appendix A, Special Considerations** — Use this appendix for procedures on how to inactivate partitions, validate PPU percent-utilization information with PPU web-portal reports, and for information on PPU security.
- **Appendix B, Glossary** — Use this appendix for definitions of PPU system and software terms.
- **Appendix C, Manpages** — Use this appendix for reading the actual HP-UX manpages: `ppu`, `ppud`, and `ppuconfig`. This section applies to HP-UX systems only.
- **Appendix D, PPU Services and Command References** — Use this appendix for more information about Windows PPU services and commands. This section applies to Windows systems only.

## Typographic Conventions

This document uses the following conventions.

<i>audit</i> (5)	An HP-UX manpage. In this example, <i>audit</i> is the name and 5 is the section in the <i>HP-UX Reference</i> . On the web and on the Instant Information DVD, it may be a hot link to the manpage itself. From the HP-UX command line, you can enter “ <code>man audit</code> ” or “ <code>man 5 audit</code> ” to view the manpage. See <i>man</i> (1).
<i>Book Title</i>	The title of a book. On the web and on the Instant Information DVD, it may be a hot link to the book itself.
<b>KeyCap</b>	The name of a keyboard key. Note that <b>Return</b> and <b>Enter</b> both refer to the same key.
<i>Emphasis</i>	Text that is emphasized.
<b>Bold</b>	Text that is strongly emphasized.

<b>Bold</b>	The defined use of an important word or phrase.
ComputerOut	Text displayed by the computer.
<b>UserInput</b>	Commands and other text that you type.
Command	A command name or qualified command phrase.
<i>Variable</i>	The name of a variable that you may replace in a command or function or information in a display that represents several possible values.
[ ]	The contents are optional in formats and command descriptions. If the contents are a list separated by  , you must choose one of the items.
{ }	The contents are required in formats and command descriptions. If the contents are a list separated by  , you must choose one of the items.
...	The preceding element may be repeated an arbitrary number of times.
	Separates items in a list of choices.

## PPU Documentation

### PPU User's Guide History

This is the fourth edition of the *HP Pay per use (PPU) User's Guide*.

### Locating the PPU User's Guide for versions 7.x

You can find the *HP Pay per use (PPU) User's Guide for versions 7.x* in the following locations:

- For the most up-to-date version of the user's guide and for localized language-specific versions, go to the following HP documentation web site (search for "PPU User's Guide"):  
<http://www.docs.hp.com>
- May 2005 HP-UX 11i v2 Instant Information DVD (Second edition)
- In the PPU 7.x software product on HP-UX, located in:  
`/usr/share/doc/PayPerUseUserGuide.pdf`

- Starting with the third edition, on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit, Version 3.2 or higher (located at:  
`\contents\doc\en_us\PayPerUseUserGuide.pdf`)

New information may have been developed after the time of this edition. For the most current information, visit the following HP documentation web site:

<http://www.docs.hp.com>.

For Windows-related information, especially release notes, visit the following web site:

<http://www.hp.com/support/itaniumservers/>

## Manpages

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### NOTE

The information contained in this section applies only to HP-UX systems. It does not apply to Integrity servers running Microsoft Windows Server 2003.

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The PPU software product contains the most up-to-date manpages. For details of the following PPU manpages, at the time of this document's publication, see Appendix C, "PPU Manpages (HP-UX only)," on page 85:

- *ppu* (5): An overview of the PPU software
- *ppud* (1M): The daemon that provides system configuration and CPU usage information to the utility meter
- *ppuconfig* (1M): For setting the configuration values of a PPU system

## HP Encourages Your Comments

HP welcomes any feedback that helps us improve the quality of our documentation. To provide feedback, go to the following HP web site:

<http://www.docs.hp.com/assistance/feedback.html>

Please include document title, manufacturing part number, and any comment, error found, or suggestion for improvement you have concerning this document. Also, please include what we did right so we can incorporate it into other documents.

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# 1

## Pay per use Overview

The HP Pay per use for HP 9000 and HP Integrity servers (PPU) 7.x software product provides you cost savings by enabling your HP server to be on one of the following HP contractual lease agreements:

- Processor Percent Utilization (*percent utilization*)
- Number of Active Processors (*active CPU*)

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### NOTE

Currently, the “Percent Utilization” pricing model is the only one provided on Integrity servers running Windows Server 2003.

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As your computing demands vary, you are charged according to the processor usage. The PPU software product is a part of the HP Utility Pricing Solutions (formerly On Demand Solutions) program.

This user’s guide provides you with the most recent information on using the PPU versions 7.x software.

This chapter covers the following topics:

- “Pay per use Program” on page 16
- “PPU Overview” on page 17
- “Most Recent PPU Versions and Supported Platforms” on page 20

## **Pay per use Program**

In previous versions of PPU on HP-UX (HP product T1322AA) a customer's usage charges were calculated based on the number of active processors in the system. Starting with version B.05.00 (HP product T2351AA), PPU offers an alternative pricing model in which you are charged for the percent utilization of the active processors.

With the release of PPU version B.07.00 (HP product T2351AA), both pricing models are supported for HP enterprise servers running HP-UX. Your contract with HP determines which pricing model you are on. The release of the product on Windows Integrity servers added PPU support for HP Integrity servers running Windows Server 2003 (but only with the "percent utilization" pricing model).

The billing amounts vary as your processor usage needs increase or decrease. This is different than traditional financing approaches that are based on fixed-payment amounts for a specified period.

PPU versions 7.x are currently available for specified HP enterprise servers running HP-UX 11i v1 and 11i v2, and for HP Integrity servers running Windows Server 2003 (Enterprise and Datacenter editions). See "Most Recent PPU Versions and Supported Platforms" on page 20 for details.



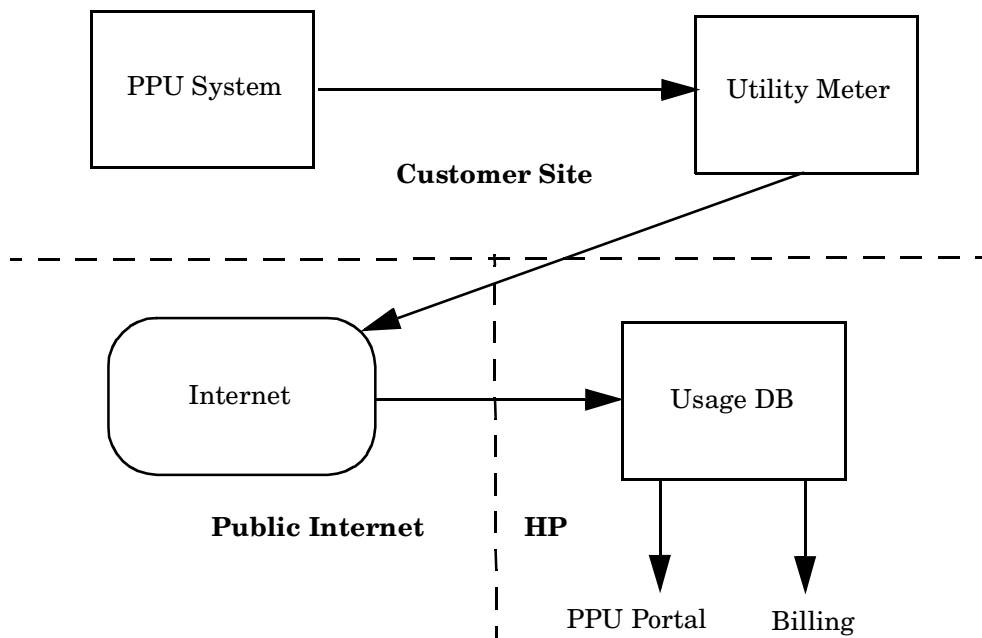
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## PPU Overview

PPU 7.x consists of the following components:

- PPU system (hardware and software)
- Utility meter (hardware and software)
- Usage database

**Figure 1-1 PPU Components**



<b>PPU Software</b>	<p>The software, which runs on the PPU system, consists mainly of a “PPU Agent”. The PPU Agent reports the following information to the utility meter:</p> <ul style="list-style-type: none"><li>• System-identification information</li><li>• Hardware-partition information</li><li>• Virtual-partition information (HP-UX only)</li><li>• Per-processor-utilization information for the operating system instance</li></ul>
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<b>NOTE</b>	<p>The PPU Agent is the software component that provides information to the utility meter. On HP-UX systems, this component is implemented as a daemon (“ppud” daemon). On Windows systems, this component is implemented as a service (“PPU Service”).</p>
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You interact with the PPU Agent when you need to do any of the following: view PPU system settings, specify a utility meter, specify a system identifier, set a processor cap (HP-UX only), or test the connection to the utility meter.

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<b>IMPORTANT</b>	<p>If the connection to HP is broken, and no usage information is sent to HP, HP may assume 100 percent processor utilization.</p>
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<b>Utility Meter</b>	<p>To track the actual processor usage, the utility meter receives reports from the PPU Agent. The utility meter is a dedicated appliance (generally an IA-32 system running Linux) connected to your network and preloaded with HP software. The utility meter is installed and configured by your HP service representative. One utility meter can support up to 100 PPU systems or partitions.</p> <p>Refer to the <i>Utility Meter User Guide version 7.x</i> for details on configuring a utility meter for a PPU system. This guide is available from the HP documentation web site under the <b>Utility Pricing Solutions</b> (formerly On Demand Solutions) link: <b><a href="http://www.docs.hp.com/hpux/netsys/index.html">http://www.docs.hp.com/hpux/netsys/index.html</a></b></p>
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**Usage Database**      The usage database receives information from the utility meter. The information is then aggregated and posted to the PPU web portal for your viewing. See “PPU Web Portal” on page 50 for details on the PPU web portal.

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**NOTE**      If usage data for any partition in the complex is not received for any given day, an e-mail notification is sent to your PPU system-contact’s e-mail address. This e-mail address is configured in the utility meter’s initial setup.

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## Most Recent PPU Versions and Supported Platforms

**Table 1-1** Most Recent PPU Versions and Supported Platforms

Software and Version	Operating System Version	Supported Hardware Platforms	Where to Find
PPU B.11.23.07.02 (T2351AA)	HP-UX 11i v2	hp Integrity servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rx8620</li> <li>• rx7620</li> </ul> hp 9000 servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rp8420</li> <li>• rp8400</li> <li>• rp7420</li> <li>• rp7410</li> </ul>	Available on: <ul style="list-style-type: none"> <li>• <a href="http://www.software.hp.com">http://www.software.hp.com</a></li> <li>• May 2005 HP-UX 11i v2 Operating Environment media</li> <li>• May 2005 HP-UX 11i v2 Applications Software media</li> </ul>
PPU B.07.00 (T2351AA)	HP-UX 11i v1	hp 9000 servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rp8420</li> <li>• rp8400</li> <li>• rp7420</li> <li>• rp7410</li> </ul>	Available on: <ul style="list-style-type: none"> <li>• <a href="http://www.software.hp.com">http://www.software.hp.com</a></li> <li>• June 2004 HP-UX 11i v1 Operating Environment media*</li> <li>• June 2004 HP-UX 11i v1 Applications Software media*</li> </ul> * newer patched version B.07.00.01 can be found at <a href="http://www.software.hp.com">www.software.hp.com</a>

**Table 1-1                      Most Recent PPU Versions and Supported Platforms (Continued)**

<b>Software and Version</b>	<b>Operating System Version</b>	<b>Supported Hardware Platforms</b>	<b>Where to Find</b>
PPU 7.1 (T2765AA)  *Percent Utilization pricing model only	Windows Server 2003 (Enterprise and Datacenter 64-bit Editions)	hp Integrity servers: <ul style="list-style-type: none"> <li>• Superdome</li> <li>• rx8620</li> <li>• rx7620</li> </ul>	Available on: <ul style="list-style-type: none"> <li>• Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit, Version 3.3</li> <li>• <a href="http://www.hp.com/support/itaniumservers/">http://www.hp.com/support/itaniumservers/</a></li> </ul>

Note that the only operating systems permitted to run inside a PPU system are HP-UX and Windows Server 2003. If the PPU system is using the “number of active processors” pricing model, only HP-UX is allowed.

Pay per use Overview

## **Most Recent PPU Versions and Supported Platforms**

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## 2

# Understanding PPU Requirements

This chapter covers the following topics:

- “PPU Program Requirements” on page 24
- “PPU Software Requirements” on page 25
- “PPU System Move Requirements” on page 29

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## **PPU Program Requirements**

You must comply with the following HP Utility Pricing Solutions program conditions to participate in the PPU program:

- Maintain the PPU software on every partition in the complex, including virtual partitions on HP-UX systems (PPU software is a non-intrusive and low-overhead software module)
- Maintain the HP-required hardware and software operation of the PPU utility meter
- Maintain the PPU software connection from each partition to the utility meter (this is required on every partition in the complex, including virtual partitions on HP-UX systems)
- Migrate to later PPU software versions when they become available

For specific details on your individual PPU program requirements, refer to your Utility Pricing Solutions contract from HP or your authorized channel partner.

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### **IMPORTANT**

Participants of the Utility Pricing Solutions program who do not meet these requirements may be in breach of contract. This can result in unnecessary expense for both the PPU program participant and HP.

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## PPU Software Requirements

PPU systems are required to run the PPU software on every partition in the complex. These partitions report information to the utility meter (located on your network). If the PPU software on your PPU system does not send usage reports, your system's processors may be assumed to be at 100 percent utilization.

### Required Version of Utility Meter Software

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#### IMPORTANT

The PPU 7.x software is inoperable if the Utility Meter software is not version 7.3 (or higher).

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### HP-UX 11i v1 Requirements

#### For PPU Versions 7.x on HP-UX 11i v1

The following software is required for PPU 7.x on HP-UX 11i v1:

- ☐ HP-UX 11i v1
- ☐ PPU software bundle T2351AA (version B.07.00) located on the following HP web site (search for "T2351AA"):  
<http://www.software.hp.com>
- ☐ WBEM software bundle B8465BA (version A.01.05 or higher)
- ☐ The kernel configuration must include the diag2 module
- ☐ Network access to utility meter software version 7.3 (or higher)

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#### NOTE

On hp 9000 Superdome servers, the Utility subsystem firmware must be 6.40 or greater. PPU is not supported on versions prior to 6.40. The Utility firmware revision is displayed in two places by the Management Processor (MP). To determine your version, look at the main menu when you first log in to the MP, or type **CM** at the main menu to display the command menu, then **HE** for help.

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## PPU Software Requirements

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### NOTE

On hp 9000 servers rp8400 and rp7410, PDHC firmware version 2.03 or greater is required.

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Your PPU system is shipped with the correct version of HP-UX and the PPU software bundle. Note that a patched version of PPU, version B.07.00.01, is currently required and can be downloaded from the web site <http://www.software.hp.com> (search for “T2351AA”). If your system’s operating system is reinstalled with Ignite-UX, ensure that the correct version of HP-UX is used and the PPU software is reinstalled. See “Getting Started” on page 32 for details.

### Required Patches for PPU on HP-UX 11i v1

Because the PPU versions 7.x software can activate and deactivate processors, the following patches (or superseded patches) are required for PPU 7.x systems running HP-UX 11i v1:

- PHKL\_22987: S700\_800 11.11 pstat() patch
- PHKL\_23154: S700\_800 11.11 dflush() patch
- PHKL\_25218: S700\_800 11.11 PDC Call retry, PDC SCSI\_PARMS, iCOD hang fix
- PHKL\_26232: S700\_800 11.11 Psets Enablement patch, FSS iCOD patch
- PHCO\_24396: S700\_800 11.11 /etc/default/tz patch
- PHCO\_24477: S700\_800 11.11 sar(1M) patch
- PHCO\_29832: S700\_800 11.11 reboot(1M) patch
- PHCO\_29833: S700\_800 11.11 killall(1M) patch

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### IMPORTANT

For the most up-to-date required patches, refer to the PPU Installation page on the HP web site <http://www.software.hp.com> (search for “T2351AA”).

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## HP-UX 11i v2 Requirements

### For PPU Versions 7.x on HP-UX 11i v2

The following software is required for PPU 7.x on HP-UX 11i v2:

- ❑ HP-UX 11i v2

- ❑ PPU software bundle T2351AA (version B.11.23.07.02) located on the following HP web site (search for “T2351AA”):  
<http://www.software.hp.com>
- ❑ WBEM software bundle B8465BA (version A.01.05 or higher, or version A.02.00 or higher for PA-RISC systems)
- ❑ nPartition provider NPar bundle (version B.11.23.01.04 or higher, available from the OE)
- ❑ The kernel configuration must include the diag2 module
- ❑ Network access to utility meter software version 7.3 (or higher)

Your PPU system is shipped with the correct version of HP-UX and the PPU software bundle. If your system’s operating system is reinstalled with Ignite-UX, ensure that the correct version of HP-UX is used and the PPU software is reinstalled. See “Getting Started” on page 32 for details.

#### **Required Patches for HP-UX 11i v2**

No patches are known for HP-UX 11i v2 systems at the time of publication of this document.

#### **Upgrading PPU Software (HP-UX)**

You can easily upgrade the PPU software from versions 5.x and 6.x to version 7.x. If you are running PPU version 4.x, the upgrade to version 7.x requires a utility meter. If you want to upgrade from PPU version 4.x to version 7.x, you can utilize an existing utility meter, or order a utility meter from HP. Contact your HP sales representative if you have questions about upgrading to PPU version 7.x software.

#### **Windows Server 2003 Requirements**

##### **For PPU Versions 7.x on Windows Server 2003**

The following software is required for PPU 7.x on Windows Server 2003:

- ❑ Windows Server 2003, 64-bit (either Enterprise or Datacenter edition)
- ❑ WMI nPar Provider, 64-bit, version 2.0 or higher
- ❑ WMI Mapper for Windows Server 2003 64-bit Edition, version 2.0 or higher

**PPU Software Requirements**

- ❑ Baseboard Management Controller Driver (required by WMI nPar Provider), version 7.2.3790.3 or higher
- ❑ Network access to a utility meter (version 7.3 or higher)

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**IMPORTANT**

Windows PPU is only supported with the latest firmware, available on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit, Version 3.2 or higher.

---

Your PPU system is shipped with the correct version of Windows Server 2003 and the PPU software. If your system's operating system is reinstalled, ensure that the correct version of Windows, the PPU software, and other required components are used. See "Getting Started" on page 32 for details.

**OS Updates for Windows Server 2003**

No OS updates are known to be required at the time of publication of this document. The latest version of this document can be found online at: **<http://www.docs.hp.com>**. Future updates, including firmware, drivers and documentation can be found at **<http://www.hp.com/support/itaniumserver>**.

## **Firmware Requirements**

With the release of the PPU versions 7.x software, the following firmware versions are required for the specified HP PPU hardware platforms:

- HP 9000 Superdome: the Utility subsystem firmware must be version 6.40 or greater.
- HP 9000 rp8400 and rp7410: the PDHC firmware must be version 2.03 or greater.
- HP Integrity Superdome, rx8620, and rx7620: for Windows servers, the firmware must be the latest supported for the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit, Version 3.2 or higher.

---

## **PPU System Move Requirements**

If you are planning to physically move your PPU system from its current street address, refer to your Master Lease Agreement for details.

Understanding PPU Requirements  
**PPU System Move Requirements**

---

# 3

## Installing and Configuring PPU Software

This chapter covers the following topics:

- “Getting Started” on page 32
- “Installing PPU Software” on page 37
- “Configuring PPU Software” on page 41
- “Reinstalling PPU Software” on page 47
- “Uninstalling PPU Software” on page 47

---

## Getting Started

### Factory Integrated Systems (HP-UX only)

You do not need to install the PPU 7.x software on your PPU system if it was ordered in (or after) January 2004. The PPU software was already installed by HP prior to delivery. However, initially you need to configure the PPU software to communicate with the utility meter.

---

### NOTE

The PPU 7.x software must be installed and configured on every partition in the complex, including virtual partitions on HP-UX systems. The PPU software bundle T2351AA is a selectable product when installing the HP-UX operating environment (OE). With Windows, it is in the SmartComponent, **hp CPU PayPerUse Agent for Windows Server 2003 64-bit Edition**. (If extracted, the installer file is CPUPayPerUseAgent64.msi.)

---

## Verifying PPU Functionality on HP-UX Systems

Perform the following steps to verify your partition has the PPU 7.x software installed and configured for communication with the utility meter:

- Step 1.** Verify the PPU software is installed by executing the following command:

```
/usr/sbin/swlist | grep T2351AA
```

You should see output similar to:

```
T2351AA          B.11.23.07.02          HP Pay per use (PPU)
```

If you do not receive the correct result for **Step 1**, see “Installing PPU Software” on page 37 for PPU software installation details.

- Step 2.** Configure the PPU software to communicate with the utility meter, and test its proper function, by executing the following command:



```
/usr/sbin/ppuconfig -m meter
```

Where *meter* is the hostname or IP address of a valid utility meter.

You should see output similar to:

The utility meter IP/hostname is set to 'meter.corp.com'.

Pay Per Use daemon (ppud) started.

The `ppuconfig -m` command/option also starts the `ppud` daemon if it is not running. If you do not receive the correct result for **Step 2**, see “Configuring PPU Software” on page 41 for PPU software configuration details.

---

**IMPORTANT**

You need to configure the PPU software so your partition communicates with the utility meter. PPU systems do not have the PPU software configured at the HP factory. See “Configuring PPU Software” on page 41 for details on configuring the utility meter settings.

---

- Step 3.** Verify that communication can be established between the Pay per use software and the configured utility meter, by executing the command:

```
/usr/sbin/ppuconfig -t
```

You should see output similar to:

Round trip communication with the utility meter succeeded.

If **Steps 1** through **Step 3** provide the correct results, your PPU system is compliant and no action is necessary for PPU software installation or configuration.

## Verifying PPU Installation and Functionality on Windows Systems

Perform the following steps on each of your Windows partitions to verify they have the PPU software installed and configured for communications with the utility meter. Note that the PPU software is *not* factory-installed on Windows systems, and therefore this verification

generally cannot be completed until you have first followed the steps outlined in the sections “Installing on Windows Server 2003 Systems” on page 39 and “Configuring PPU Software” on page 41.

**Step 1.** Open **Services.msc**, also known as the Services applet. Look for “HP Pay Per Use”, or open a command window, type **sc query ppuservice**, and press **Enter**. If the service is not listed, then PPU is not installed. Therefore, proceed to the next section “Installing on Windows Server 2003 Systems” on page 39. If the service is listed, then PPU is installed. Proceed to the next step to verify that the service is started and operating correctly.

**Step 2.** To verify that the PPU service is running, perform one of the following:

- Open the `services.msc` applet (**Start>Programs>Administrative Tools>Services**), find “HP Pay Per Use” and ensure the status shows as “started”. If not, right click to start. Or,
- From a `cmd.exe` shell, type “`sc query ppuservice`”. If it is not running, you should see output similar to this:

```
SERVICE_NAME: PPUService
      TYPE: 110  WIN32_OWN_PROCESS  (interactive)
      STATE: 1  STOPPED
              (NOT_STOPPABLE,NOT_PAUSABLE,IGNORES_SHUTDOWN)
      WIN32_EXIT_CODE: 0  (0x0)
      SERVICE_EXIT_CODE: 0  (0x0)
      CHECKPOINT: 0x0
      WAIT_HINT: 0x0
```

Type “`sc start ppuservice`” to start this service. If the service is already started, you should see output like this:

```
SERVICE_NAME: PPUService
      TYPE: 110  WIN32_OWN_PROCESS  (interactive)
      STATE: 4  RUNNING
              (STOPPABLE,NOT_PAUSABLE,ACCEPTS_SHUTDOWN)
      WIN32_EXIT_CODE: 0  (0x0)
      SERVICE_EXIT_CODE: 0  (0x0)
      CHECKPOINT: 0x0
      WAIT_HINT: 0x0
```

- Step 3.** Configure the PPU software to communicate with the utility meter, and test its proper function, by executing the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -m  
meter
```

(where *meter* is the hostname or IP address of a valid utility meter), and press **Enter**. If the PPU Service is running and the Utility Meter is valid and reachable, you should see no response.

The `ppuconfig -m meter` command/option also starts the Windows Pay per use service if it is not running.

- Step 4.** Verify that communication can be established between the Pay per use software and the configured utility meter, by executing the command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu\ppuconfig -t
```

You should see output similar to:

```
Testing the connection to a utility meter. This operation  
can take 3-5 minutes to complete...
```

```
Round trip communication with the utility meter succeeded.
```

If the meter is incorrect, or otherwise not reachable, you might see something like:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>ppuconfig -t
```

```
Testing the connection to a utility meter. This operation  
can take 3-5 minutes to complete...
```

```
ERROR: Unable to send Pay Per Use report to utility meter.
```

```
Received the following error:
```

```
Invalid locator: meter.hp.com:5989
```

```
ERROR: Test of connection to specified utility meter failed.
```

```
Verify that the configuration parameters are correctly  
specified, and that the utility meter and network are  
working properly.
```

If **Steps 1** through **Step 4** provide the expected results (as described above), your PPU system is operational, and the PPU software is installed and configured correctly. If there are unexpected results, you

may need to redo either the installation or configuration steps. See the sections “Installing PPU Software” on page 37 or “Configuring PPU Software” on page 41 for details.

### **Errors During Verification**

Use the following error descriptions to determine the nature of problems encountered during PPU verification. Then refer to “Configuring PPU Software” on page 41 for instructions on how to fix the problem.

#### **PPU service is not installed**

If you receive the following output from the command `sc query ppuservice`, PPU is not installed and you should proceed to the next section, “Installing PPU Software” on page 37:

```
[SC] EnumQueryServicesStatus:OpenService FAILED 1060:
```

The specified service does not exist as an installed service.

#### **PPU service is running, but utility meter is invalid or unreachable**

After issuing the `ppuconfig -m meter` command, an error of this type is indicated by either of the following error messages:

```
Unable to send Pay Per Use report to utility meter. Received  
the following error: Invalid locator: <utility meter  
hostname or IP address>
```

or,

```
Test of connection to specified utility meter failed. Verify  
that the configuration parameters are correctly specified,  
and that the utility meter and network are working properly.
```

## Installing PPU Software

If you currently have PPU software installed that is older than version B.05.00 (for example, version B.04.01), contact your HP sales representative to find out how to update to PPU 7.x software.

### Find the Latest Patches (HP-UX)

This document lists the patches required to install and run PPU 7.x software known at the time of publication. To find the most current patches, go to the HP Software Depot at <http://www.software.hp.com> and perform the following steps:

- Step 1.** Enter the PPU software product T2351AA into the **search** text box then click the **search** button.
- Step 2.** Click the **Pay per use Agent Software** link that appears as a result of your search.
- Step 3.** Click the **installation** link, near the bottom of the page.

The required patches for PPU 7.x are listed. You can then retrieve the necessary patches from the HP web site: <http://www.itrc.hp.com>

### Installing from the HP-UX Media (HP-UX)

Follow this procedure to install the PPU 7.x software on your HP-UX 11i v1 or 11i v2 system from either the Operating Environment or Applications Software media:

- Step 1.** Log in as `root`.
- Step 2.** Determine the DVD drive device file by entering the following command:  
  

```
ioscan -fnC disk
```
- Step 3.** Insert the Operating Environment or Applications Software DVD into the drive.

- Step 4.** Mount the DVD drive to the desired directory. The following example uses the `/dev/dsk/c1t2d0` device file (from **Step 2**) and the `/cdrom` directory. To mount the drive, enter a similar command as:

```
mount -r /dev/dsk/c1t2d0 /cdrom
```

- Step 5.** Install the PPU 7.x bundle T2351AA from the DVD:

```
swinstall -s /cdrom T2351AA
```

- Step 6.** Continue with “Configuring PPU Software” on page 41.

### Installing from the HP Software Depot (HP-UX)

- Step 1.** Do a search for the PPU product T2351AA at the HP Software Depot web site: <http://www.software.hp.com>

- Step 2.** Click the **Pay per use Agent Software** link that appears as a result of your search

- Step 3.** Read the “overview” page, then click the **installation** link (at the bottom of the page).

- Step 4.** Read the “installation” page, then click the **receive for free** button.

- Step 5.** Fill in the registration information, click the appropriate operating system link, and then click the **Next** button.

- Step 6.** Click the appropriate link, under the “download software” table title, and download the depot file to the following directory: `/var/tmp`

You can rename the download but the default is:

```
/var/tmp/T2351AA_B.07.02_HP-UX_B.11.23_IA+PA.depot
```

- Step 7.** On the PPU system, log in as `root`.

- Step 8.** Install the appropriate PPU bundle:

```
swinstall -s \  
/var/tmp/T2351AA_B.07.02_HP-UX_B.11.23_IA+PA.depot '*'
```

You can also use the interactive `swinstall` to install the depot file by setting the target to `/var/tmp/<package_name>`. The PPU 7.x software is a low-overhead and non-intrusive software module. The file-system size increases by approximately 5MB and a reboot is not required.

**Step 9.** Continue with “Configuring PPU Software” on page 41.

## Installing on Windows Server 2003 Systems

Before installing the PPU software, ensure that all drivers, utilities, and security updates for your system available on the Smart Setup and Smart Update media have been installed. In particular, the Smart Components containing the prerequisite products HP WMI nParProvider, HP WMI Mapper, and HP Baseboard Management Controller Driver (the Driver is automatically installed by the Support Pack) should already have been installed.

---

### NOTE

Do not install the PPU software on a remote management station. You must install this software on a hard partition of the HP Integrity server running the Windows Server 2003 (Enterprise or Datacenter Edition) 64-bit operating system.

---

To install the PPU 7.x software on each hard partition running Windows Server 2003:

- Step 1.** Log onto the first Windows partition of the target server as Administrator (use the administrative logon and password, or use an account with Administrator privileges).
- Step 2.** Browse the Smart Setup CD or the <http://www.hp.com/support/itaniumservers> website for your appropriate server type and then navigate to the Pay per use (PPU) package. The title of the Smart Component is **hp CPU PayPerUse Agent for Windows Server 2003 64-bit Edition**.
- Step 3.** When the component is displayed, click **Download** and choose **Run**.
- Step 4.** In the **HP Package Setup** screen, you can choose **Extract** or **Install**. Choose **Install** to complete the installation with minimal prompting for a “typical” installation. Choose **Extract** if you wish more control over the installation options; in the case of PPU, the only significant installation option is whether or not PPU should be installed in a directory other than the default location.
- Step 5.** In all cases, you will be prompted to accept a license agreement during the installation.

- Step 6.** When the installation is complete, reboot the partition if you are prompted to do so - or if you previously deferred a reboot after the installation of the WMI nPartition Provider. (If the installation fails or the PPU service fails to start, you should definitely reboot and try reinstalling PPU.)
- Step 7.** The installation also updates the system PATH, so if you do not reboot after the installation, you should close and reopen any command prompt windows that you plan to use for configuration and management of PPU.

### **Additional Windows Installation Considerations**

The packaging and installation of Pay per use changed between the initial version 7.01 and version 7.1. In 7.01, Pay per use was included with the WMI nPar Provider component, and only visible as a subcomponent of the WMI nPar Provider. Do not mix installation modes between the old and the new methods (PPU as a subcomponent or nPar or PPU as a separate entity). After a successful PPU installation, PPU is listed separately under **Add or Remove Programs**. Do not attempt to reinstall PPU by modifying the WMI nPar Provider package.

Upgrading the WMI nPar Provider or WMI Mapper may cause the PPU service to stop running. After upgrading the WMI nPar Provider or WMI Mapper, reboot or check the status of the **HP Pay Per Use** service in the Windows Services applet to make sure the service is still running.

If the installation fails, or the PPU service fails to start, it may be because of a deferred but necessary reboot after installing the WMI nPar Provider. Try rebooting, and if necessary, reinstalling PPU.



---

## Configuring PPU Software

After you have successfully installed the PPU 7.x software, you need to configure the PPU software connection to the utility meter. The utility meter must be configured on every partition in the complex (including virtual partitions on HP-UX systems).

---

### NOTE

The following configuration procedure assumes your utility meter has been installed on the PPU system's network by your HP service representative. If the utility meter is not installed, contact your HP service representative.

You may need to perform up to three steps to configure a partition. At a minimum, you must set the name of the utility meter. If you want to specify a name other than your partition's hostname as the system identifier, you must perform additional steps. If you want to set a cap, or maximum, for the number of active processors (HP-UX systems only), you must also perform additional steps.

To summarize, in order to configure the PPU software you must do the following:

- Step 1.** Configure the utility meter (required)
- Step 2.** Configure the system identifier of the partition (optional)
- Step 3.** Configure the processor cap on the partition (optional; HP-UX only)

### Configuring the Utility Meter (Required)

#### For HP-UX

To configure the utility meter, execute the following command:

```
/usr/sbin/ppuconfig -m meter
```

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the ppud daemon.

### **For Windows Server 2003**

To configure the utility meter, open a command window on each Windows partition on the server and execute the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>ppuconfig -m  
meter
```

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the PPU Service. The command assumes that PPU was installed in the default location.

---

#### **IMPORTANT**

---

The PPU 7.x software is inoperable if the Utility Meter software is not version 7.3 (or higher).

## **Configuring the System Identifier (Optional)**

### **For HP-UX**

The system identifier of a partition enables you to track your PPU system. The default system-identifier is the hostname of your partition. If you want to protect the hostname of your partition, you can change the system identifier to any value you choose. Examples of a system identifier are: an asset number, an HP support tag, or a description of a physical location.

To set the system identifier of the partition, execute the following command:

```
/usr/sbin/ppuconfig -s system_id
```

Where *system\_id* is an identifier for your partition.

---

#### **NOTE**

---

You can set the utility meter and system identifier with the single command: `/usr/sbin/ppuconfig -m meter -s system_id`

### **For Windows Server 2003**

The system identifier of a partition enables you to track your PPU system. The default system-identifier is the hostname of your partition. If you want to protect the hostname of your partition, you can change the system identifier to any value you choose. Examples of a system identifier are: an asset number, an HP support tag, or a description of a physical location.

To set the system identifier of the partition, execute the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -s  
system_id
```

Where *system\_id* is an identifier for your partition.

---

#### **NOTE**

You can also set the utility meter and system identifier with a single command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -m  
meter -s system_id
```

---

### **Configuring a Processor Cap (Optional; HP-UX)**

You can specify the number of active processors on each partition in your PPU system. To set the number of active processors for a given partition, execute the following command:

```
/usr/sbin/ppuconfig -rc number
```

Where *number* is the number of active processors you want in the partition.

---

#### **NOTE**

The `-r` option causes the processor cap to take effect immediately.

See “ppuconfig (1M) Manpage” on page 89 for details on specifying a processor cap.

## Viewing the System Settings (HP-UX and Windows)

You can use the `ppuconfig` command (with no options) to view the settings for the utility meter and system identifier, and if a processor cap is set.

### Example 3-1

#### Viewing system settings using the `ppuconfig` command

Use the following commands to verify general system settings:

HP-UX:

```
/usr/sbin/ppuconfig
```

Windows Server 2003:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig
```

You should see output similar to:

```
Utility Meter IP/Hostname:      meter1.corp.com
System Identifier:             superdomel
CPUs to be active at next reboot (CPU Cap):  all
CPUs that can be activated without a reboot:  0
Active CPUs:                   4
```

See the “`ppuconfig`” descriptions in the appropriate system-specific Appendix (C or D) for details of the `ppuconfig` command.

## Verifying the PPU Software Connection to HP

After specifying the utility meter (required), system identifier (optional), and processor cap (optional), execute the following command to verify the PPU software is communicating with the utility meter:

HP-UX:

```
/usr/sbin/ppuconfig -t
```

Windows Server 2003:

```
C:\Program Files (x86)\Hewlett-Packard\ppu> ppuconfig -t
```

You should see output similar to:

```
Testing the connection to a utility meter.
Round trip communication with the utility meter succeeded.
```

If you do not receive a similar message, correct the utility meter configuration according to the error message received.

If you receive the correct message, your partition is properly configured to communicate with the utility meter, and no further configuration of the PPU software is necessary.

To verify the utility-meter connection to HP, go to the PPU portal (see “PPU Web Portal” on page 50 for details) and confirm that a PPU test usage-report has been posted to the portal. The usage report is available from the **meter connectivity verification** link. You need to enter the System Serial Number and Software ID Number.

The existence of the report verifies that communication is established from the PPU software, to the utility meter, and ultimately to HP.

## Verifying the PPU Agent is Running

---

### NOTE

The PPU Agent is the software component that provides information to the utility meter. On HP-UX systems, this component is the `ppud` daemon. On Windows systems, this component is the PPU Service. The PPU Agent must be running on each partition in the complex (including virtual partitions on HP-UX systems). If the PPU Agent is not running on a partition, utilization information for that partition is not sent to HP, which may assume 100 percent utilization of the partition.

---

### For HP-UX

The `ppud` daemon is started when you specify a utility meter using the `ppuconfig -m meter` command. It also is started by `init` at reboot and is respawned if its process is stopped.

---

### NOTE

If the `ppud` daemon is killed, it is automatically respawned by `init`. See “`ppud` (1M) Manpage” on page 87 for details of the `ppud` daemon.

---

To verify the `ppud` daemon is running, execute the following command:

```
/usr/bin/ps -e | grep ppud
```

You should see the ppud daemon listed as an active process on the partition. If it is running, and the utility meter is properly configured, utilization information is sent to HP and your partition is correctly configured.

If the ppud daemon is not listed as an active process, inspect the `/etc/inittab` file for an entry similar to the following (look toward the bottom of the file):

```
ppud:23456:respawn:/usr/sbin/ppud # Pay-Per-Use daemon
```

If the entry does not exist in the `/etc/inittab`, start the ppud daemon by specifying the utility meter with the following command:

```
/usr/sbin/ppuconfig -m meter
```

Where *meter* is the fully-qualified hostname or IP address of the utility meter. This command/option performs a communication test to the utility meter and starts the ppud daemon.

**Time Zone Specification** The ppud daemon performs periodic operations based on the time of day. The daemon is spawned by `init` and obtains its time zone specification from the `/etc/default/tz` file. By default the time zone is set to EST5EDT. You can specify which time zone the ppud daemon uses to interpret its current time by modifying the entry in the `/etc/default/tz` file. Refer to the *environ* (5M) manpage for details of the TZ format.

### **For Windows Server 2003**

The PPU Service starts when the PPU software is installed (using the process described in “Installing PPU Software” on page 37), or when you specify a utility meter using the `ppuconfig -m meter` command. Thereafter it starts automatically, each time the partition boots.

To verify the PPU Service is running:

- Step 1.** Click **Start > Programs > Administrative Tools > Services**.
- Step 2.** Verify that the **HP Pay Per Use** service appears in the list of services, and its status is listed as “Started” (meaning it is active).

If the PPU Service is running, and the utility meter is properly configured, utilization information is sent to HP and your partition is correctly configured.

---

## Reinstalling PPU Software

If you reinstall HP-UX or Windows on a partition (for example, installing HP-UX by either cold-installing or installing from a “golden image”), you need to perform the following steps to restore your PPU configuration:

- Step 1.** Before reinstalling, execute the `ppuconfig` command and record the configuration information (utility meter, system identifier, and CPU information) from the output.
- Step 2.** Reinstall HP-UX or Windows on the partition and install the PPU software. (See “Installing PPU Software” on page 37 for details.)
- Step 3.** Using the recorded output from **Step 1**, configure the PPU settings with the `ppuconfig` command. (See “Configuring PPU Software” on page 41 for details.)

---

## Uninstalling PPU Software

---

### IMPORTANT

You should not uninstall the PPU software from a partition. If you uninstall the PPU software, you may be charged for 100 percent utilization of the processors in the partition.

---

### For HP-UX

To uninstall the PPU software, execute the following command:

```
/usr/sbin/swremove -x enforce_scripts=false T2351AA
```

---

### NOTE

Executing the above `swremove` command deliberately produces warning messages - because this is not a recommended operation. However, if the Execution Phase succeeds, the PPU software was successfully removed.

## Uninstalling PPU Software

You can verify the PPU software was successfully uninstalled by issuing the following command:

```
/usr/sbin/swlist | grep T2351AA
```

You should not see a listing of the PPU software T2351AA in the output of the `swlist` command.

### For Windows Server 2003

To uninstall the PPU software:

- Step 1.** Click **Start > Settings > Control Panel**, then double-click **Add or Remove Programs**.
- Step 2.** Highlight **HP CPU PayPerUse v7.1** in the list of currently installed programs and click **Remove**.
- Step 3.** Confirm the removal, if prompted.



This chapter covers the following topics:

- “PPU Web Portal” on page 50
- “PPU Usage Report” on page 51
- “Understanding Utilization Capping (HP-UX)” on page 56
- “New Partition Creation” on page 58
- “Partition Resizing” on page 59

## PPU Web Portal

You have access to detailed PPU-usage information through a web portal. The PPU web portal contains the following information:

- Computed-average usage on a daily basis
- Computed-average usage for a specified period of time
- Client reports (usage reports that are sent to HP), available only for PPU systems using the active CPU model

The PPU web portal can be accessed from the HP web site:

**<http://www.hp.com/go/payperuse>**

Initial access to the PPU web portal requires registration using your system-identification information. The system-identification consists of the system serial number plus the system identifier which is the SWID on PA systems, or the UUID on Integrity systems. The system identifier can be identified from the MP, or the `getconf` command on HP-UX, or it can be found at the tag `<uniqueidentifier>` in a PPU usage report. See “PPU Usage Report” on page 51 for more information. After your password-protected account is set up, you can access usage information for your PPU servers.

---

### NOTE

Usage data is posted to the PPU web portal two days after it was collected. For example, usage data for today is available at the portal two days from today.

---

---

## PPU Usage Report

The most recent PPU usage report is retained on your partition. On HP-UX systems, you can access this usage report at:  
`/var/ppu/PPUReport.xml`.

On Windows systems, you can access the usage report in the directory where PPU is installed. By default, this location is:  
`C:\Program Files (x86)\Hewlett-Packard\ppu\PPUReport.xml`.

---

### NOTE

If the connection between the PPU software and the utility meter is broken, PPU usage reports are cached to disk (at `/var/ppu/cache` on HP-UX systems, and at `C:\Program Files (x86)\Hewlett-Packard\ppu\cache` on Windows systems) until the connection is re-established. After the connection is broken, the PPU software checks for a good connection every 5 minutes. The cached PPU usage reports are encrypted and cannot be viewed.

---

The PPU usage reports are easier to read if you open them with a browser that can interpret XML, but note that the XML interpretation will also attempt to access the utility meter referenced in the XML file. If your browser does not support XML, or you do not have network access to the utility meter, you can open this file with a text-based editor such as Wordpad on Windows.

Example 4-1 shows a typical PPU usage report from an HP-UX system. For the same type of usage, a report from a Windows system might differ only in the system information such as `OSType` and `CPUType`.

### Example 4-1 PPU 7.x Usage Report (HP-UX example)

```
<?xml version="1.0" ?>
<!DOCTYPE PPUReport (View Source for full doctype...)>
- <PPUReport>
- <ReportData>
  <ReportType>Asset</ReportType>
  <ReportVersion>1.0</ReportVersion>
</ReportData>
- <System>
  - <SystemInfo>
    - <ComplexInfo>
```

## Using the PPU Software

### PPU Usage Report

```
<SerialNumber>XYZ4032503</SerialNumber>
<ProductNumber>A6752A</ProductNumber>
<UniqueIdentifier>AZ299uk4343345994</UniqueIdentifier>
<TotalCPUs>8</TotalCPUs>
<IsHardPartitioned>true</IsHardPartitioned>
</ComplexInfo>
-<OSInstanceInfo>
  <SystemIdentifier>Asset#:890343</SystemIdentifier>
  <OSType>HP-UX</OSType>
  <OSVersion>B.11.11</OSVersion>
  <IsVirtualPartition>false</IsVirtualPartition>
  <CPUType>778</CPUType>
</OSInstanceInfo>
</SystemInfo>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSampleStartTime>1033822800</UTCSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:00:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>75.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>80.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>40.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>65.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSampleStartTime>1033823100</UTCSampleStartTime>
```

```
<LocalSampleStartTime>Sat Oct 5 00:05:00 2002</LocalSampleStartTime>
<Timezone>MDT</Timezone>
<SampleDuration>300</SampleDuration>
-<UsageEntry>
  <CPUID>4</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>52.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>5</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>78.000</PercentCPUUsage>
</UsageEntry>

-<UsageEntry>
  <CPUID>6</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>84.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>7</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>36.000</PercentCPUUsage>
</UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCStartTime>1033823400</UTCStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:10:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>17.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>41.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>28.000</PercentCPUUsage>
```

**PPU Usage Report**

```

    </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>36.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSampleStartTime>1033823700</UTCSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:15:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>45.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>63.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>55.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>49.000</PercentCPUUsage>
  </UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSampleStartTime>1033824000</UTCSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:20:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>15.000</PercentCPUUsage>

```

```
</UsageEntry>
-<UsageEntry>
  <CPUID>5</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>23.000</PercentCPUUsage>
</UsageEntry>
-<UsageEntry>
  <CPUID>6</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>40.000</PercentCPUUsage>
</UsageEntry>

-<UsageEntry>
  <CPUID>7</CPUID>
  <CPUSpeed>440</CPUSpeed>
  <PercentCPUUsage>27.000</PercentCPUUsage>
</UsageEntry>
</Usage>
-<Usage>
  <TotalNumCPUs>4</TotalNumCPUs>
  <NumActiveCPUs>4</NumActiveCPUs>
  <UTCSampleStartTime>1033824300</UTCSampleStartTime>
  <LocalSampleStartTime>Sat Oct 5 00:25:00 2002</LocalSampleStartTime>
  <Timezone>MDT</Timezone>
  <SampleDuration>300</SampleDuration>
  -<UsageEntry>
    <CPUID>4</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>44.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>5</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>53.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>6</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>32.000</PercentCPUUsage>
  </UsageEntry>
  -<UsageEntry>
    <CPUID>7</CPUID>
    <CPUSpeed>440</CPUSpeed>
    <PercentCPUUsage>28.000</PercentCPUUsage>
```

## Understanding Utilization Capping (HP-UX)

```
</UsageEntry>
</Usage>
-<HardPartition>
  <UpdateTimestamp>Sat Oct 5 00:00:00 2002</UpdateTimestamp>
  <LocalID>0</LocalID>
  <NumHardPartitions>2</NumHardPartitions>
  <NumFreeCPUs>0</NumFreeCPUs>
  -<HardPartitionEntry>
    <ID>0</ID>
    <IsActive>true</IsActive>
    <NumCPUs>4</NumCPUs>
  </HardPartitionEntry>

  -<HardPartitionEntry>
    <ID>1</ID>
    <IsActive>true</IsActive>
    <NumCPUs>4</NumCPUs>
  </HardPartitionEntry>
</HardPartition>
</System>
<Checksum />
</PPUReport>
```

---

## Understanding Utilization Capping (HP-UX)

---

### NOTE

PPU for Windows does not support Utilization Capping. Instead, you can control the number of available processors in a particular partition using either the `parmgr` command, or the deconfigure option of the Extensible Firmware Interface.

You are billed by HP according to the usage of the active processors in your PPU system. For example, if you are on the percent utilization metric and have a 32-processor PPU Superdome system, you are billed the same amount whether you utilize all 32 processors at 50 percent utilization, or you utilize 16 processors at 100 percent utilization.



You can cap the usage of processors in your PPU system in any of these ways:

- **ppuconfig command** — The `ppuconfig` command provides the easiest way to limit computing resources. To specify an immediate cap (maximum) on the number of active processors in a partition, use the `ppuconfig -rc number` command — where *number* is the number of active processors you want in the partition. You must have at least one active processor per cell board. See “`ppuconfig` (1M) Manpage” on page 89 for details of the `ppuconfig` command.
- **Workload Manager (WLM)** — WLM in combination with PPU provides a utility for setting computing resources. WLM can address both fixed-resource capping (that is, placing an upper bound on utilization) as well as dynamic-resource allocation to address service-level objectives. Refer to the most current *HP-UX Workload Manager User's Guide* for details.
- **Partition management** — With either the `parmodify` command or `Parmgr`, you can assign and activate or unassign and deactivate cells to control the number of active processors. Refer to the most current *HP System Partitions: Administration for nPartitions* for details.
- **Deconfigure** — Use the appropriate boot-level interface for your server system to control the number of available cells or processors in your partition. On Integrity servers, you use the Extensible Firmware Interface (EFI) and on PA-RISC systems, you use the HP-UX boot console handler (BCH). The basic procedure is:
  1. Reboot your partition and stop the boot process at the boot-level interface (BCH or EFI).
  2. Deconfigure the processors using the appropriate `cpuconfig` or `cellconfig` command and per the configuration rules.
  3. Boot the partition.

---

## **New Partition Creation**

You must install and configure the PPU software on any newly created partitions in the complex (including virtual partitions on HP-UX systems). See “Installing PPU Software” on page 37 for installation details. See “Configuring PPU Software” on page 41 for configuration details.

---

### **IMPORTANT**

Any partition not having the PPU software installed and configured (and reporting to the utility meter) can be assumed to have 100% processor utilization.

---

---

## **Partition Resizing**

Partitions can be resized generally without affecting PPU, other than changes in reported usage. If the processor cap feature (`ppuconfig -c`) is in use, the cap may need to be adjusted when a partition is resized.

Using the PPU Software

## **Partition Resizing**

---

# 5

## Troubleshooting

This chapter covers the following topics:

- “General Troubleshooting” on page 62
- “Troubleshooting the PPU Software” on page 63

## General Troubleshooting

As a first step in troubleshooting problems with the PPU software, the following are some general guidelines to consider before proceeding to the platform-specific troubleshooting sections.

If usage data for all partitions is missing at the portal or a connectivity test fails (`ppuconfig -t`) for all partitions, this may indicate a configuration problem with the utility meter.

If usage data for only some partitions is missing at the portal, or a connectivity test fails only for some partitions, you may have configuration problems for specific partitions. In this case, you should check for errors logged by the PPU agent in the failing partitions, check that the PPU agent is installed, properly configured and running in the failing partitions, and check the network connection from the partition to the utility meter.

Finally, you should be sure `parstatus` is working. For failures in virtual partitions, check the vPar commands such as `vparstatus`.

For troubleshooting commands specific to HP-UX and Windows, see the following sections.

## Troubleshooting the PPU Software

### For HP-UX

If the PPU software is not functioning, execute the following command:

```
/usr/sbin/swverify T2351AA
```

The swverify command confirms that:

- the PPU software is installed
- the connection from the PPU system to the utility meter is functional

Alternatively, you can troubleshoot your PPU system by performing the following individual steps:

- Step 1.** Verify that the PPU software is installed on your PPU system by executing the following command:

```
/usr/sbin/swlist | grep T2351AA
```

You should see output similar to:

```
T2351AA          B.11.23.07.02          HP-UX Pay Per Use (PPU)
```

If you do not receive the correct output, see “Installing PPU Software” on page 37 for details on installing the PPU software.

- Step 2.** Verify that the PPU system is configured to communicate with the utility meter, and the connection to HP is functional, by executing the following command:

```
/usr/sbin/ppuconfig -t
```

You should see the following output:

```
Round trip communication with the utility meter succeeded.
```

If you do not receive the correct output, see “Configuring PPU Software” on page 41 for details of configuring the utility meter.

- Step 3.** Go to the PPU portal and verify that a test usage report for the partition is posted on the portal. (See “PPU Web Portal” on page 50 for details.)

- Step 4.** Ensure the ppud daemon is running by executing the following command:

```
/usr/bin/ps -e | grep ppud
```

You should see a ppud process running. If you do not, then see “Verifying the PPU Agent is Running” on page 45.

- Step 5.** Look in the syslog file `/var/adm/syslog/syslog.log` for ppud errors.
- Step 6.** Verify that the executable and configuration files have not been deleted and the permissions are set correctly as listed in Table 5-1:

**Table 5-1 PPU Executable and Configuration Files**

File	Permissions
<code>/usr/sbin/ppuconfig</code>	500
<code>/usr/lib/libppu.sl</code> (PA-RISC) or <code>/usr/lib/hpux64/libppu.so</code> (Integrity systems)	500
<code>/usr/sbin/ppud</code>	500
<code>/etc/ppu/ppu_config</code>	500
<code>/etc/ppu/ppuclient.pem</code>	500

- Step 7.** If any of the files in **Step 6** are missing or corrupted, then reinstall the PPU software. See “Installing PPU Software” on page 37 for details.
- Step 8.** Ensure that the kernel driver `diag2` is built into the kernel.
- Step 9.** Ensure that the WBEM bundle B8465BA is installed (version 1.05 or higher, or version 2.0 or higher for PA-RISC systems on HP-UX 11i v2).
- Step 10.** Ensure that the nPartition provider bundle NPar (version B.11.23.01.03 or higher) is installed (HP-UX 11i v2 only).
- Step 11.** Ensure that the Utility Meter software is version 7.3 or higher.
- Step 12.** For HP-UX 11i v1 systems, verify that the required 11i v1 patches are installed. See “Required Patches for PPU on HP-UX 11i v1” on page 26 for details.



## For Windows Server 2003

If you experience problems with your Windows PPU system you should first refer to the Windows Application Event Viewer to see if there are specific error messages associated with the problem (click **Start > Programs > Administrative Tools > Event Viewer**, and double-click on **System** and/or **Application**).

Alternatively, you can troubleshoot your Windows PPU system by performing the following steps:

- Step 1.** Follow the procedure described in “Verifying PPU Installation and Functionality on Windows Systems” on page 33 to verify the PPU software is installed correctly and configured for communications with the utility meter.
- Step 2.** Verify that the PPU system is configured to communicate with the utility meter, and the connection to HP is functional, by executing the following command:

```
C:\Program Files (x86)\Hewlett-Packard\ppu\ppuconfig -t
```

You should see the following output:

```
Round trip communication with the utility meter succeeded.
```

If you do not receive the correct output, see “Configuring PPU Software” on page 41 for details of configuring the utility meter.

- Step 3.** Go to the PPU portal and verify that a test usage report for the partition is posted on the portal. (See “PPU Web Portal” on page 50 for details.)
- Step 4.** Open **Services.msc**, also known as the Services applet. Look for “HP Pay Per Use”, or open a command window, type **sc query ppuservice**, and press **Enter**. If the PPU service is not listed, you will need to install the PPU software as described in “Installing PPU Software” on page 37.
- Step 5.** Verify the “Administrators Group” and Local System accounts have full read/write permissions on the PPU directory.
- Step 6.** Check for any error messages related to PPU in the Windows Event Viewer. Select “Programs”, then “Administrative Tools” and “Event Viewer”. In the Event Viewer window, click on “Application” and then search the Source column for events related to “PPUService”.
- Step 7.** Verify the following files exist in the PPU installation directory (C:\Program Files (x86)\Hewlett-Packard\ppu):

- ppuconfig.exe
- ppuservice.exe
- ppu\_config  
(if this file is missing for some reason, it can be recreated by running the ppuconfig command, and specifying a utility meter with the -m option and system identifier with the -s option)
- ppuclient.pem  
(this is a PPU-specific SSL (Secure Socket Layer) certificate required for communicating with the utility meter server)

If any of these files are missing or corrupted, reinstall the PPU software. See “Installing PPU Software” on page 37 for details.

**Step 8.** Verify the **WMI nParProvider** service is running. Click **Start > Programs > Administrative Tools > Services.msc** and scan the list to find the service, and verify the status is “Started”. Or alternatively, run the “sc query wminparprovider” command from a command window, and verify the service is running. Output should be similar to the following:

```
C:\Program Files (x86)\Hewlett-Packard\ppu>sc query
wminparprovider
```

```
SERVICE_NAME: wminparprovider
        TYPE               :10  WIN32_OWN_PROCESS
        STATE                :4  RUNNING
                           (STOPPABLE, PAUSABLE, IGNORES_SHUTDOWN)
        WIN32_EXIT_CODE       :0  (0x0)
        SERVICE_EXIT_CODE   :0  (0x0)
        CHECKPOINT           :0x0
        WAIT_HINT            :0x0
```

**Step 9.** Check that the Utility Meter software is version 7.3 or higher.

**Step 10.** Check that the Baseboard Management Controller Driver (HP Health Driver) is installed. The WMI nParProvider component requires this device driver in order to provide a communication path between the MP and the operating system running on an nPartition.

---

# 6

## Frequently Asked Questions

This chapter covers frequently asked questions on the following topics:

- “Pay per use Program” on page 68
- “Pay per use Software” on page 70

---

## Pay per use Program

### What is Pay per use?

Pay per use (PPU) is a pricing model in which you are charged for actual processor usage. You acquire a specific hardware platform and number of processors, and are charged for the actual usage, based on one of the following HP contractual agreements:

- Processor percent utilization (*percent utilization*)
- Number of active processors (*active CPU*)

---

### NOTE

Currently, the “Percent Utilization” pricing model is the only one provided on Integrity servers running Windows Server 2003.

---

### What is the benefit of Pay per use, as opposed to traditional processor usage financing?

With Pay per use, your billing is based on actual processor usage. The billing amounts vary as your processor usage needs increase or decrease. This is different than the traditional financing approaches that are based on fixed-payment amounts for the coverage period.

### Is Pay per use the same as leasing?

No. A lease is a fixed monthly payment. PPU charges vary on actual processor usage. With PPU, a fixed charge and a variable charge appear on your monthly statement. The fixed charge is similar to a standard lease, and the variable charge is based on actual processor usage.

### Can one HP enterprise server be under both a Pay per use (PPU) and Instant Capacity (formerly iCOD) contract at the same time?

No, the PPU and Instant Capacity software bundles are mutually exclusive. They can both be installed on the same HP enterprise server, but because the server can only be purchased using either PPU or Instant Capacity (but not both), the server can only be configured for the purchased pricing solution.

**What HP enterprise servers support Pay per use versions 7.x?**

See “Most Recent PPU Versions and Supported Platforms” on page 20 for the list of supported HP servers for PPU 7.x.

## Pay per use Software

### What software product is required for PPU 7.x systems?

With HP-UX systems, the HP pay per use (PPU) 7.x software product is T2351AA.

You can verify PPU is installed by executing:

```
/usr/sbin/swlist | grep T2351AA
```

Output should be similar to this:

```
T2351AA      B.11.23.07.02      HP-UX Pay Per Use (PPU)
```

For Windows on Integrity, launch the Control Panel and select **Add or Remove Programs** to verify that the PPU Service is displayed as “HP CPU PayPerUse v7.1”.

For both operating systems, another requirement is network access to a utility meter running software version 7.3 or later. The utility meter software can be found at [www.software.hp.com](http://www.software.hp.com) by searching for “Pay Per Use Meter Software”.

### What patches are required for running PPU 7.x software on an HP enterprise server that is running HP-UX 11i v1?

See “Required Patches for PPU on HP-UX 11i v1” on page 26 for the required patches for PPU 7.x on HP-UX 11i v1.

### What patches or OS updates are required for running PPU 7.x software on HP Integrity servers running Microsoft Windows Server 2003?

There are none at the time of publication of this document. See the following web sites for the most recent information.

- HP web site (search for “PPU”): <http://www.software.hp.com>
- Technical support for all HP Integrity servers:  
<http://www.hp.com/support/itaniumservers/>

### How can I get the PPU 7.x software bundle for either HP-UX 11i v1 or 11i v2?

The PPU 7.x software bundle T2351AA is installed at the factory for new systems. The T2351AA bundle is available from the following:

- HP web site (search for “T2351AA”): <http://www.software.hp.com>
- May 2005 HP-UX 11i v2 Operating Environment media
- May 2005 HP-UX 11i v2 Applications Software media
- June 2004 HP-UX 11i v1 Operating Environment media
- June 2004 HP-UX 11i v1 Applications Software media

See “Installing PPU Software” on page 37 for details of installing the PPU 7.x software bundle T2351AA.

#### **How can I get PPU software for Windows Servers (64-bit Enterprise or Datacenter Editions)?**

The PPU 7.x software is available on the Smart Setup media associated with HP Integrity Servers for Microsoft Windows Server 2003 64-bit, Version 3.2 or higher, and at <http://www.hp.com/support/itaniumservers/> (search for PPU).

#### **We received an e-mail message indicating a partition did not report system configuration and utilization data. What is the problem and how do I correct it?**

Make sure that the PPU software is installed and the connection is properly configured to the utility meter for the partition. All partitions (including virtual partitions with HP-UX systems), must have the PPU software installed and the PPU software configured to connect to the utility meter. See “Troubleshooting the PPU Software” on page 63 for details on ensuring your PPU system is compliant and functional.

#### **How many usage reports are retained on the PPU system?**

The PPU system retains the latest usage report. For a complete history of your usage reports go to the PPU web portal. See “PPU Web Portal” on page 50 for details.

You can view the latest PPU usage report for your HP-UX system by invoking a web browser that supports XML and opening the `PPUReport.xml` file found at: `/var/ppu/`. On Windows systems, you can use a browser that supports XML, or if your browser does not support XML, you can use a text-based editor such as Wordpad to open the `PPUReport.xml` file found at: `C:\program files (x86)\Hewlett-Packard\ppu\` (or whichever directory PPU was installed in).

**When is information sent by the PPU software?**

A system report is sent from the PPU software to the utility meter at the following times:

- System startup
- Approximately every 30 minutes, when the system is running
- System shutdown

**What is the difference between PPU versions 6.x and 7.x? (HP-UX only)**

The main difference between these two PPU versions (HP product T2351AA) is that with versions 6.x only the percent utilization metric can be measured and contractually arranged with HP. With PPU versions 7.x, either the percent utilization or the active CPU metric can be arranged contractually with HP. Also, PPU 7.x enables you to set a processor cap, and PPU B.07.02 adds support for virtual partitions on HP-UX 11i v2 systems. See the Pay per use Release Notes for details of the changes from versions 6.x to 7.x.

**What is the difference between PPU versions 7.01 and 7.1 on Windows systems?**

The packaging and installation of Pay per use has changed with this release. Previously, Pay per use was included with the WMI nPar Provider component, and visible only as a subcomponent of the nPar Provider. With this release, PPU is a separate Smart Setup component with its own installation process, and, after a successful installation, PPU should have its own entry in the list of currently installed programs as shown from the **Control Panel/Add or Remove Programs**.



---

# A

## Special Considerations

This appendix describes special considerations for PPU systems.

This appendix includes:

- “Inactive Partitions in PPU Systems” on page 74
- “PPU Percent-Utilization Information Verification (HP-UX)” on page 76
- “PPU Security” on page 79

---

## Inactive Partitions in PPU Systems

Baseline usage for the PPU program is included in the minimum monthly payment. Your baseline usage is defined in your Master Lease Agreement with HP. Inactive partitions in PPU systems are covered under baseline usage.

---

### NOTE

An inactive partition is reported as “IDLE”, in the measurement “Method” column, on the PPU web-portal report.

---

An inactive partition has all of the cells in the partition inactive. An inactive cell is either powered off, or in a state prior to boot-level control (prior to BCH/EFI), defined as “waiting on SINC\_BIB”.

For HP-UX systems, to configure a partition to “waiting on SINC\_BIB”, execute the following command:

- `shutdown -R -H`

If you have already shut down your partition without these options, you can still place it into an inactive state by doing one of the following through the GSP interface:

- Enter the RR command to put the partition in a “waiting on SINC\_BIB” state.
- Enter the PE command to power down all the cells in the partition.

For Windows systems, use a menu path of **Start > Shutdown** to shut down the Windows partition. Once the partition is shut down you can put it into an inactive state also by using one of the GSP interface commands:

- Enter the RR command to put the partition in a “waiting on SINC\_BIB” state.
- Enter the PE command to power down all the cells in the partition.

HP receives usage reports from active partitions in your PPU system. Any inactive partitions are identified in the PPU-usage reports.

---

**NOTE**

---

At least one partition in the complex must always be active so that usage and inactive-partition information can be reported to HP.

Active cell-boards, which are assigned to active partitions, must have at least one active processor. If your partition does not have any near-term need to have at least one processor active per active cell-board, then you can do one of the following:

- Inactivate the partition.
- Unassign cell boards from partitions. When you unassign a cell board from a partition, all processors on that cell board are inactive. Unassigned cell-boards are covered under the baseline usage.

**Failed Partitions**

When a partition fails, and you no longer want to report any usage for that partition, you can do one of the following through the GSP interface:

- Reset the failed partition, by entering the RS command.
- Power down all of the cells in the failed partition by using the PE command.

The other partitions in the complex report the failed partition as inactive.

**Dual-core and Inactive Cells**

When a cell contains dual-core processors and is powered down (inactive), then if PPU is running on another partition in the complex, PPU will report the number of CPUs for the inactive cell as if it contained single-core processors. For example, if the inactive cell contains 8 processors, PPU will include only 4 CPUs when calculating TotalCPUs for the complex.

---

## PPU Percent-Utilization Information Verification (HP-UX)

Your PPU system's processor-utilization information is available from the HP PPU web portal. See "PPU Web Portal" on page 50 for details of the PPU web portal.

If you want to verify PPU percent-utilization information against the PPU web-portal information, use the `sar` command to compare processor-utilization numbers. The `sar` command is an HP-UX system activity reporter that samples and accumulates processor utilization. Refer to the *sar* (1M) manpage for details on the `sar` command.

An overview of the processor-utilization verification process is:

1. Create processor-utilization numbers for your PPU system with the `sar` command.
2. Go to the PPU web portal and capture processor-utilization numbers for the same PPU system and duration of time.
3. Verify the `sar` utilization numbers against the PPU web-portal utilization numbers.

Use the following procedure to perform the utilization-verification process:

---

### NOTE

Because the PPU web-portal's utilization reports contain 30 minutes of information, beginning on the hour or on the half-hour, perform **Step 1** immediately at the start of a hour, or at half-past the hour. Another option is to create a shell script that contains the command in **Step 1** and schedule a `cron` job so it starts exactly on the hour or half hour.

---

- Step 1.** In a terminal window on the PPU system, execute the following command:
- ```
/usr/bin/nice --10 /usr/sbin/sar -o /tmp/sarOut 300 12
```

Where “300” represents the (averaged) interval duration of the utilization sample, in seconds, and “12” represents the number of samples taken. In this example, 12 utilization samples are taken every 5 minutes; therefore, one hour of utilization data is collected. Because the PPU web portal also reports in 5-minute increments, use a 5-minute interval duration with the `sar` command. You can vary the amount of `sar` information with its last argument.

- Step 2.** After **Step 1** has completed, execute the following command:
- ```
/usr/sbin/sar -uM -f /tmp/sarOut > /tmp/sarOut.report
```

In this step, the binary output from the `sar` command in **Step 1** is converted into a readable (text) format, and captured in the file `/tmp/sarOut.report`.

- Step 3.** Go to the PPU web portal and locate the processor-utilization reports for the PPU system and the same duration of time used in **Step 1**. The PPU web portal is located at: <http://www.hp.com/go/payperuse>

- Step 4.** Validate the processor-utilization numbers from the PPU web-portal reports and the processor-utilization numbers from the `sar` command, which are located in the file `/tmp/sarOut.report`.

The PPU web-portal report and the information from the `sar` command differ as follows:

- The `sar` command reports the processor as the system’s “SPU” number and the PPU web-portal report uses the “CPU ID”.
- For the same 5 minute interval, the `sar` command’s time stamp is for the end of the interval and the PPU web-portal report’s time stamp is for the beginning of the interval. For example, compare the `sar` utilization numbers for 12:05pm to the PPU web-portal report utilization numbers for 12:00pm.
- To verify processor-percent-utilization numbers, you need to sum the two `sar` report columns “%usr” and “%sys”, and compare them against the PPU web-portal report’s percent utilization.

## Special Considerations

### PPU Percent-Utilization Information Verification (HP-UX)

- The `sar` command rounds processor percent-utilization up to the nearest integer; therefore, individual measurements for the same time period can vary by one percent. Also, since it may be difficult to get the timing of a `sar` measurement to align exactly with the timing of a PPU measurement, comparisons of specific measurements may also vary due to timing differences, but comparisons of the average utilization over time should match within one percent range.

---

## PPU Security

The PPU software transmits the following information to the utility meter:

- System identification:
  - Serial number
  - Product number
  - System identifier
- System configuration:
  - Number of partitions
  - Cells in partitions
  - Processors in cells
- System state:
  - Processor state
  - Processor usage
  - Partition state

The default system-identifier for your PPU partition is its hostname. You can use the `ppuconfig -s` command/option if you want to specify a different system identifier for your PPU partition.

---

### NOTE

All data that is transferred from the PPU software to the utility meter is obscured.

---

Special Considerations  
**PPU Security**



---

## **B            Glossary**

---

## Pay per use Terminology

The following terms are commonly used in conjunction with Pay per use (PPU):

### **configured processors**

Processors that have been configured at the boot console handler (BCH or EFI) and are available for activation.

### **deconfigured processors**

Processors that have not yet been configured at the boot console handler (BCH or EFI). The PPU software cannot activate a processor that is deconfigured.

### **hard partition**

A physical partitioning of a computer that divides the computer into groups of cell boards where each group operates independently of the other groups. A hard partition can run a single instance of the operating system or be further divided into virtual partitions.

### **Instant Capacity**

Also called iCAP, and formerly known as Instant Capacity On Demand, or iCOD. The HP Utility Pricing Solutions product that has a pricing model based on purchasing components (processors, cell boards, and memory). With Instant Capacity you initially purchase a specified number of activated components and pay a *right-to-access* fee for a specified number of deactivated components. To activate an Instant Capacity component, you purchase the component and license it through the application of a codeword.

### **inactive cell**

On a hardware-partitionable system, a cell that is either powered off, or in a state prior to BCH, defined as “waiting on SINC\_BIB”.

**inactive partition**

A partition where all of the cells in the partition are inactive.

**Pay per use**

The HP Utility Pricing Solutions product that has a pricing model in which you are charged for actual processor usage. You acquire a specific hardware platform, and number of processors, and are charged for the actual usage, based on either the percent of processor utilization or the number of active processors.

**PPU Agent**

The software component that provides information to the utility meter. On HP-UX systems, this component is implemented as a daemon (“ppud” daemon). On Windows systems, this component is implemented as a service.

**portal**

An HP web site that gives customers an interface to view their PPU system-utilization information. See “PPU Web Portal” on page 50 for details.

**usage database**

The HP repository that contains PPU system-utilization information. You can access this information through the PPU web portal.

**utility meter**

The software and hardware device that receives PPU system-utilization information from the PPU software. The utility meter is initially installed and configured by an HP service representative.

**virtual partition**

A software partitioning of a computer or hard partition where each virtual partition contains an instance of an operating system. Though a hard partition can contain multiple virtual partitions, the inverse is not true (that is, a virtual partition cannot span hard partition boundaries).

---

# C

## PPU Manpages (HP-UX only)

This appendix contains the following command references for PPU on servers running HP-UX.

- “ppu (5) Manpage” on page 86 — An overview of the PPU software
- “ppud (1M) Manpage” on page 87 — A data provider that reports system configuration and CPU usage information
- “ppuconfig (1M) Manpage” on page 89 — For setting the configuration values of a pay per use system

---

### NOTE

The information contained in these manpages is current at the time of publication for this manual.

---

---

## **ppu (5) Manpage**

### **ppu (5)**

#### **NAME**

ppu – Pay per use software for HP-UX

#### **DESCRIPTION**

Pay per use (PPU) is a program under which customers pay only for computing capacity that they use. The PPU Software provides services for metering resource utilization on supported HP systems. Depending on the type of contract a PPU system is under, utilization can be either of the actual percentage utilization of each CPU, or a count of the number of active CPUs in the system. The PPU software communicates with a utility meter to report utilization data. The utility meter in turn transmits the utilization data to HP for proper billing

PPU systems must be configured to use a utility meter. Utility meter configuration is accomplished using the `ppuconfig` command (see *ppuconfig* (1M)).

The data that is sent to HP is aggregated and then sent to billing; it is also posted on the utility portal for viewing at **<http://www.hp.com/go/payperuse>**.

For more information see the Pay per use user's guide located at `/usr/share/doc/PayPerUseUserGuide.pdf`.

#### **SEE ALSO**

*ppud* (1M), *ppuconfig* (1M)

---

## **ppud (1M) Manpage**

### **ppud (1M)**

#### **NAME**

ppud – Pay per use agent

#### **SYNOPSIS**

Path:    /usr/sbin  
ppud

#### **DESCRIPTION**

ppud is a daemon that provides system configuration and CPU usage information to a utility meter system for billing purposes. This daemon runs on Pay per use systems and meters CPU utilization and system configuration information. The ppud daemon sends this information to a utility meter as an XML file.

When a report is sent to a utility meter, it is also written to the file /var/ppu/PPUReport.xml. This report is best viewed using a web browser that understands XML. If the connection to the utility meter fails, the ppud daemon caches the report data until the connection is restored.

The ppud daemon re-spawns itself if killed. The following entry is added to /etc/inittab in order to have ppud start and re-spawn itself:

```
ppud:23456:respawn:/usr/sbin/ppud # Pay-Per-Use daemon
```

The ppud daemon is automatically started when a system boots if a utility meter has been specified via the ppuconfig command (see *ppuconfig* (1M)). The ppud daemon does not need to be restarted when the meter configuration is changed via the ppuconfig command.

The ppud daemon reports errors via syslog.

To unconfigure Pay per use, execute:

```
swremove -x enforce_scripts=false T2351AA
```

## ppud (1M) Manpage

Warning, if this is a Pay per use system and the daemon is not running, usage may be assumed to be 100%.

The ppud daemon performs periodic operations based on the time of day. The ppud daemon is spawned by `init` and gets its timezone specification from the `/etc/default/tz` file. By default the timezone specified in `/etc/default/tz` is EST5EDT. You can specify which timezone the ppud daemon uses to interpret its current time by modifying the `/etc/default/tz` file. Refer to *environ* (5) for details of the TZ format. A restart of the ppud daemon is required before the new timezone value takes effect (that is, kill the `/usr/sbin/ppud` process).

## AUTHORS

ppud was developed by HP

## FILES

`/etc/default/tz` File contains the timezone value used by ppud. The format for the file is the same as the TZ environment variable format without the prefix TZ=. See *environ* (5) for details of the TZ format.

`/var/ppu/cache` Directory contains the report data that is cached if the connection to the utility meter fails.

## SEE ALSO

*ppuconfig* (1M), *ppu* (5)



---

## **ppuconfig (1M) Manpage**

### **ppuconfig (1M)**

#### **NAME**

ppuconfig – configure Pay per use daemon

#### **SYNOPSIS**

```
Path:    /usr/sbin
ppuconfig
ppuconfig -m meter
ppuconfig -s system_id
ppuconfig -h
ppuconfig -c {cap|all} [-r]
ppuconfig -r
ppuconfig -t
```

#### **DESCRIPTION**

ppuconfig is a tool for configuring communication between the Pay per use daemon ppud (see *ppud* (1M)) and a utility meter. A utility meter must be specified for a Pay per use system before the ppud daemon will collect and send utilization data to HP. In the absence of this data, HP may assume 100% utilization and bill for the system accordingly.

If ppuconfig is invoked without any options, the current settings will be displayed.

If this is the first time you are supplying utility meter configuration information, after specifying the utility meter with the ppuconfig command, it is recommended to execute **ppuconfig -t** to perform a round trip communication test. If the test is successful, verify the ppud daemon is running using the *ps* command.

When ppuconfig is used to modify the configuration information related to the utility meter, it is not necessary to restart the ppud daemon. When configuration information is modified it is recommended that **ppuconfig -t** is executed to verify the new configuration.

`ppuconfig` can also be used to place a cap on the number of active processors, thereby limiting the maximum utilization reported to HP.

## Options

`ppuconfig` recognizes the following command-line options and arguments:

`-c {cap|all}` Specifies the number of CPUs that should be active on this partition the next time it boots. Upon the next partition reboot, CPUs will be deactivated until this value is reached. Specification of the value “all” means that all CPUs that can be active, should be active. “all” is the default cap.

To specify a cap and make it take effect immediately, specify the `-r` option in conjunction with the `-c` option.

Note: the `-c` option does not apply to virtual partitions. To limit the number of active CPUs in a virtual partition, use the *vparmodify (1M)* command to assign or unassign processors.

`-h` Specifies that the hostname should be used as the system identifier for the Pay per use system when reporting usage information.

`-m meter` Specifies the utility meter that the Pay per use system should use for reporting. The meter can be specified as a fully qualified hostname or IP address. A non-blank value is required.

`-r` Reconcile. Instructs `ppuconfig` to activate or deactivate CPUs to get to the specified cap value. `ppuconfig` will only deactivate processors from the default processor set (0) and will never deactivate the last processor in a cell or the last processor in the partition.

Note: this option does not apply to virtual partitions.

<b>-s</b> <i>system_id</i>	Specifies an identifier for the partition that the Pay per use system should use when reporting. This can be any value that helps you to identify this system (for example, a tracking number, asset number, physical location, etc). Until a system identifier is specified, the hostname will be used by default. This identifier is transmitted to HP and shows up on the PPU portal to help you identify your system.
<b>-t</b>	Perform communication test between Pay per use software and the configured utility meter.

## RETURN VALUES

ppuconfig exits with one of these values:

0	Success.
>0	Failure; error message sent to STDERR

## EXAMPLES

The following example shows configuration of the utility meter to a system called alpha.corp.com followed by testing communication with that meter.

```
ppuconfig - m alpha.corp.com
```

```
ppuconfig -t
```

The following example shows how to set the number of active processors to three and make it take place immediately.

```
ppuconfig -rc 3
```

The following example shows how to remove a cap from the system and always have all processors active.

```
ppuconfig -c all
```

The following example shows how to set the system ID for this system. The system ID can be any text that helps you better identify your system.

```
ppuconfig -s "rp8410 in bldg 7 1st floor:ID#234879"
```

PPU Manpages (HP-UX only)

**ppuconfig (1M) Manpage**

## AUTHORS

ppuconfig was developed by HP

## FILES

/etc/ppu/ppu\_config File containing utility meter configuration data.  
If this file is removed, the ppud daemon will not be started at system boot and utilization data will not be transmitted to HP.

/var/ppu/PPUReport.xml File created every 30 minutes containing a report of the CPU utilization over the last 30-minutes for this partition.

## SEE ALSO

*ppud* (1M), *ppu* (5)

---

# D

## PPU Service and Command References (Windows only)

This appendix contains the following command and service references for PPU on Integrity servers running Windows Server 2003.

- “PPU Software” on page 94 — an overview of the PPU software
- “HP Pay Per Use Service” on page 95 — a data provider that reports system configuration and CPU usage information
- “ppuconfig Command” on page 96 — a command for setting the configuration values of your Pay per use system

---

## PPU Software

<b>Name</b>	Pay per use software for Windows Server 2003
<b>Description</b>	<p>Pay per use (PPU) is a program where customers pay only for the computing capacity they use. The PPU Software provides services for metering resource utilization on supported HP systems. For billing purposes, utilization is determined by the actual percentage utilization of each CPU.</p> <p>The PPU software communicates with a utility meter to report utilization data. The utility meter in turn transmits the utilization data to HP for proper billing</p> <p>PPU systems must be configured to use a utility meter. Utility meter configuration is accomplished using the <code>ppuconfig</code> command (see “<code>ppuconfig</code> Command” on page 96).</p> <p>The data that is sent to HP is aggregated and then sent to billing; it is also posted on the utility portal for viewing at: <b><a href="http://www.hp.com/go/payperuse">http://www.hp.com/go/payperuse</a>.</b></p> <p>By default, the PPU Software is installed at this location: C:\Program Files (x86)\Hewlett-Packard\ppu</p> <p>For more information, see the <i>Pay per use User's Guide</i> located on your SmartSetup media at: \\contents\doc\en_us\PayPerUseUserGuide.pdf.</p>
<b>See Also</b>	<p>“HP Pay Per Use Service” on page 95</p> <p>“<code>ppuconfig</code> Command” on page 96</p>

---

## HP Pay Per Use Service

<b>Name</b>	ppuservice
<b>Description</b>	<p>ppuservice (HP Pay Per Use Service) is a Windows service that provides system configuration and CPU usage information to your utility meter for billing purposes. The service meters CPU utilization and server configuration information, and sends that information to the utility meter as an XML file. Messages and errors are logged to the Windows Event Log.</p> <p>Reports are written to the cache directory (C:\Program Files (x86)\Hewlett-Packard\ppu\cache) before being forwarded to the utility meter at 30-minute intervals. Reports are best viewed using a web browser that can interpret XML. If your browser does not support XML, you can open these files with a text-based editor such as Wordpad on Windows. If the connection to the utility meter fails, the report data is cached until the connection is restored.</p> <p>ppuservice is first started during installation or when you specify your utility meter using the ppuconfig command. Thereafter it restarts automatically any time the partition is rebooted. If for some reason the service is killed manually, it can also be launched again by running the ppuconfig -m meter command.</p> <p>Note that ppuservice requires the nParProvider service to be running. If the nParProvider service stops while ppuservice is running, eventually ppuservice will detect this, and will issue an event log error and will display a message similar to “ERROR: HP Pay per use is not supported on this class system, or the local HP WMINParProvider is not running. Please double check your configuration”. This causes the PPU service to stop as well. If this happens, the administrator can start both services using the services.msc applet.</p>
<b>See Also</b>	<p>“PPU Software” on page 94</p> <p>“ppuconfig Command” on page 96</p>

---

## ppuconfig Command

**Name** ppuconfig

**Synopsis**

```
ppuconfig
ppuconfig -m meter
ppuconfig -s system_id
ppuconfig -h
ppuconfig -t
```

**Description** ppuconfig is a command-line tool for configuring communication between ppuserice and a utility meter. A utility meter must be specified for a Pay per use system before ppuserice can collect and send utilization data to HP. In the absence of this data, HP may assume 100% utilization and bill for the system accordingly.

If ppuconfig is issued without any options at all, the current system settings are displayed.

If this is the first time you are supplying utility meter configuration information, after specifying the utility meter with the ppuconfig command, you should issue the **ppuconfig -t** command to perform a round trip communication test.

When using ppuconfig to modify your PPU configuration with the utility meter, it is not necessary to restart ppuserice. However, when doing this, it is recommended that you issue the **ppuconfig -t** command to verify the new configuration.

**Options** ppuconfig recognizes the following command-line options and arguments:

<b>-m <i>meter</i></b>	Specifies the utility meter that the Pay per use system should use for reporting. The meter can be specified as a fully qualified hostname or IP address. A non-blank value is required.
<b>-s <i>system_id</i></b>	Specifies an identifier for the partition that the Pay per use system should use when reporting. This can be any value that helps you to identify this system (for example, a tracking number, asset number, physical



**ppuconfig Command**

location, etc). Until a system identifier is specified, the hostname will be used by default. This identifier is transmitted to HP and shows up on the PPU portal to help you identify your system.

- h Specifies that the hostname should be used as the system identifier for the Pay per use system when reporting usage information.
- t Perform communication test between Pay per use software and the configured utility meter.

**Examples**

The following example shows configuration of the utility meter to a system called alpha.corp.com followed by testing communication with that meter in a default installation.

```
C:\Program Files (x86)\Hewlett-Packard\ppu:> ppuconfig - m
alpha.corp.com
```

```
C:\Program Files (x86)\Hewlett-Packard\ppu:> ppuconfig -t
```

The following example shows how to set the system ID for this system in a default installation. The system ID can be any text that helps you better identify your system.

```
C:\Program Files (x86)\Hewlett-Packard\ppu:> ppuconfig
-s "rx8620 in bldg 7 1st floor:ID#234879"
```

**See Also**

“PPU Software” on page 94  
 “HP Pay Per Use Service” on page 95

PPU Service and Command References (Windows only)

**ppuconfig Command**

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